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EXAMINER	
PHAM, THANHHA S	

ART UNIT	PAPER NUMBER
2813	14

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/752,685	TRAPP, SHANE J.	
	Examiner	Art Unit	
	Thanhha Pham	2813	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 November 2002* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-25,36-46 and 64-70* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-25, 36-46, 64-70* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

This Office Action responses to Applicant's Amendment in Paper 10 dated 10/7/02.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

1. Claims 2, 6-7, 13-14, 21, 23, 25, and 36-46 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

With respect to claim 2,

It is not clear how an opening is defined as a self-aligned contact opening, how the insulating layer is etched to form the opening as a self-aligned contact opening, and a self-aligned contact opening is the opening being self-aligned to what.

With respect to claims 6-7,

"said contacting" lacking antecedent basis should be changed to "said etching"

With respect to claims 13 and 14,

It is not clear where "the sides of gate stack structures" comes from and are located.

With respect to claim 21,

Line 1, It is not clear "said fluorocarbon" refers to which said fluorocarbon. Does this "said fluorcarbon" refer to CF_4?

With respect to claim 23,

Line 1, It is not clear "said fluorocarbon" refers to which said fluorocarbon. Does this "said fluorcarbon" refer to CHF_3?

With respect to claim 25,

Line 1, It is not clear "said fluorocarbon" refers to which said fluorocarbon. Does this "said fluorcarbon" refer to CH_2F_2?

With respect to claim 36,

It is not clear how to form a pair of adjacent gate stacks in said insulative film and forming sidewall spacers on sidewalls of said adjacent gate stacks. How are sidewall spacers formed on the sidewalls of the gate stacks when the gate stacks are in the insulating layer?

With respect to claim 37,

It is not clear how a self-aligned contact opening is defined – a self-aligned contact opening is the opening being self-aligned to what.

With respect to claim 39,

Limitation "the flow rate ratio of said fluorocarbon to said ammonia is not less than about 2:1" does not further down the scope of the claim. (See independent claim 36 that cites "wherein the flow rate ratio of said at least one fluorocarbon to said ammonia is from about 2:1 to about 40:1")

With respect to claim 40,

"said flow rate ratio is within the range of about 2:1 to about 40:1" is redundant. See independent claim 36 that cites "wherein the flow rate ratio of said at least one fluorocarbon to said ammonia is from about 2:1 to about 40:1")

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claims 1, 3, 8-12, 15 are rejected under 35 U.S.C. 102(b) as being anticipated by Smolinsky et al ["Reactive Ion Etching of Silicon oxides with Ammonia and Trifluoromethane, the Role of Nitrogen in the Discharge", J. Electrochem. Soc.: Solid-State Science and Technology, Vol 129 No. 5, May 1982, pp1036-1039].

Smolinsky et al discloses the claimed method of forming an opening in an insulative layer formed over a substrate in a semiconductor device comprising: etching said insulative layer with an etchant composition consisting essentially of ammonia and at least one of fluorocarbon (CHF_3 and NH_3) so as to form said opening wherein the flow rate ratio of said at least one fluorocarbon to said ammonia is from about 2:1 to about 40:1 (4% NH_3/CHF_3) *[claims 1, 9-11 and 15];* said etching includes plasma etching *[claim 3]* and is performed through a patterned photoresist mask *[claim 8]* without forming an etch stop *[claim 12].*

2. Claims 1, 3-12, 15-18 and 20-23, as being best understood, are rejected under 35 U.S.C. 102(b) as being anticipated by Ding et al [US 5,814,563].

Notice: *This rejection is based on the situation that "consisting essentially of" is construed as equivalent to "comprising". See MPEP 2111.03, In re Herz, 537 F.2d 549, 551-52, 190 USPQ 461, 463 (CCPA 1976) (emphasis in original) (Prior art hydraulic fluid required a dispersant which appellants argued was excluded from claims limited to a functional fluid "consisting essentially of" certain components. In finding the claims did not exclude the prior art dispersant, the court noted that appellants' specification indicated the claimed composition can contain any well-known additive such as a dispersant, and there was no evidence that the presence of a dispersant would materially affect the basic and novel characteristic of the claimed invention. The prior art composition had the same basic and novel characteristic (increased oxidation resistance) as well as additional enhanced detergent and dispersant characteristics.). For the purposes of searching for and applying prior art under 35 U.S.C. 102 and 103, absent a clear indication in the specification or claims of what the basic and novel characteristics actually are, "consisting essentially of" will be construed as equivalent to "comprising."*

With respect to claims 1, 3-4, 8-12 and 15-18, Ding et al, figs 1-7 and col 1-13, discloses a method of forming an opening in an insulating layer (20, fig 1d) formed over a substrate (25,32,34, 36, fig 1d) in a semiconductor device comprising etching said insulative layer with an etchant composition consisting essentially of ammonia (NH_3) and at least one of fluorocarbon (CHF_3 and CF_4) so as to form said opening wherein flow rate ratio of said at least one fluorocarbon to said ammonia is from about 4:1 to about 10:1 (col 11-12) *[claims 1, 9-11 and 15-18];* said etching includes plasma etching *[claim 3],* is performed through a patterned photoresist mask *[claim 8]* without forming an etch stop *[claim 12],* and is performed at a temperature range of about –50 to about 80°C (see examples) *[claim 4].*

With respect to claim 5, Ding et al discloses the etching is performed within a range temperature of about 0-50°C (e.g. 50oC, col 6 lines 51-67).

With respect to claims 6-7, Ding et al discloses the etching is performed at an operating pressure of about 40-50 mTorrs (e.g. 50 mTorrs, col 5 lines 45-65).

With respect to claims 20-21, Ding et al discloses the etching is performed at the flow rate of CF_4 of about 15-20 sccm (e.g 18 sccm, col 10 lines 31-33).

With respect to claims 22-23, Ding et al discloses the etching is performed at the flow rate of CHF_3 of about 35-45 sccm (e.g. 40 sccm, col 10 lines 24-26).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-18, 20-25, 34-46 and 64-70, as being best understood, are rejected under 35 U.S.C. 103(a) as being unpatentable over Park [US 6,103,137] in view of Smolinsky et al ["Reactive Ion Etching of Silicon oxides with Ammonia and Trifluoromethane, the Role of Nitrogen in the Discharge", J. Electrochem. Soc.: Solid-State Science and Technology, Vol 129 No. 5, May 1982, pp1036-1039].

Park et al, figs 3's-4 and col 1-4, discloses a method of forming a self-aligned contact opening located in an insulative layer and between adjacent gate stacks with sidewall spacers on sidewalls of the adjacent gate stacks formed over a substrate in a semiconductor device comprising steps of:

forming a pair of the adjacent gate stacks (2/3, fig 3A-3D, col 4 lines 10-20) with the sidewall spacers (5) on the said sidewalls of the adjacent gate stacks in the insulative layer (7)*[claims 13-14, 36, 64];*

forming a patterned photoresist mask layer (8, fig 3E) over said insulative layer (7) *[claims 8 and 36];*

contacting/etching said insulative layer with a plasma etchant mixture *[claim 3]* consisting of fluorocarbon (e.g. CHF_3, C_4F_8 and CH_2F_2, col 3 lines 41-67) *[claims 9-11, 18, 36, 66]* so as to form a self-aligned contact opening in said insulative layer and between said gate stacks *[claims 2, 13, 14, 43]* wherein said sidewall spacers are not etched and defines at least in part of said self-aligned contact opening (fig 3G) *[claims 13, 14, 64]* without an etch stop (fig 3G)*[claims 12, 42, 64]*; and

removing said photoresist mask layer after said etching (fig 3F-3G) *[claim 46].*

➢ With respect to claims 1-3, 8-15, 18, 36-39, 42-43, 46, Park et al fails to teach using the plasma etchant mixture essentially consisting of ammonia and at least one fluorocarbon wherein the flow rate ratio of the at least one fluorocarbon to the ammonia being from about 2:1 to about 40:1. Smolinsky et al teaches using the plasma etchant mixture essentially consisting of the fluorocarbon and ammonia by adding ammonia to the fluorocarbon etchant wherein the flow rate ratio of the at least one fluorocarbon to the ammonia being from about 2:1 to about 40:1 to improve etch rate while maintaining a good etch selectivity of the insulative material in forming an opening – without damaging underlying layer. It would have been obvious for those skilled in the art to modify the process of Park et al by adding ammonia, as taught by Smolinsky et al, to the plasma fluorocarbon etchant mixture of to form the plasma etchant mixture as being claimed essentially consisting of fluorocarbon and ammonia of flow rate ratio of fluorocarbon: ammonia of about 2:1 to 40:1 to provide a better controlled etching process.

➢ With respect to claims 64 and 69, Park et al fails to teach: **(1)** using the plasma etchant mixture essentially consisting of ammonia and at least one fluorocarbon at temperature within the range of about –50 to 80°C to form the self-aligned contact opening with further forming a protective layer over sidewall spacers which have been formed over the gate stacks wherein the flow rate ratio of the at least one fluorocarbon to the ammonia being from about 2:1 to about 40:1; and **(2)** depositing a conductive plug inside said opening such that said conductive plug separated from said side wall spacers by said protective layer. Regarding to **(1),** Smolinsky et al teaches using the plasma etchant mixture essentially consisting of the fluorocarbon and ammonia by adding ammonia to the fluorocarbon etchant wherein the flow rate ratio of the at least one fluorocarbon to the ammonia being from about 2:1 to about 40:1 to improve etching rate while maintaining a good etching selectivity of the insulative material in forming an opening. It would have been obvious for those skilled in the art to combine the teaching of Smolinsky et al to add ammonia to the plasma etchant mixture of the process of Park et al to form the plasma etchant mixture essentially consisting of fluorocarbon and ammonia as being claimed to provide a better controlled etching process for forming the self-aligned contact opening. With combination of Smolinsky et al to the process of Park et al, the protective layer containing nitrogen would be resulted over the sidewall spacers on the gate stacks of structural device of Park et al. Although Smolinsky et al and Park et al are silent about the temperature for etching the insulative layer, the range temperature of about -50 to 80oC for etching the insulative layer is considered to involve routine optimization while has been held to be within the level of ordinary skill

in the art. As noted In re Aller 105 USPQ233, 255 (CCPA 1955), the selection of reaction parameters such as temperature and concentration would have been obvious. Regard to **(2),** Park et al discloses a method of forming a self-aligned contact opening for integrated circuit. It is would have been obvious for those skilled in the art to depositing a conductive plug inside the self-aligned contact opening formed by Park et al in view of Smolinsky et al to form conductive path for operating the device.

➢ With respect to claims 4-7, 15-17, 20-25, 39-41, 44-45, 64-70, claimed ranges of temperature, flow rates, flow rate ratios in the etching step, absent evidence of disclosure of criticality for the range giving unexpected results, are considered to involve routine optimization while has been held to be within the level of ordinary skill in the art. As noted in In re Aller 105 USPQ233, 255 (CCPA), the selection of reaction parameters such as temperature and concentration would have been obvious.

> "Normally, it is to be expected that a change in temperature, or in concentration, or in both, would be an unpatentable modification. Under some circumstances, however, changes such as these may be impart patentability to a process if the particular ranges claimed produce a new and unexpected result which is different in kind and not merely degree from the results of the prior art...such ranges are termed "critical ranges and the applicant has the burden of proving such criticality... More particularly, where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation."

See also In re Waite 77 USPQ 586 (CCPA 1948); In re Scherl 70 USPQ 204 (CCPA 1946); In re Irmscher 66 USPQ 314 (CCPA 1945); In re Norman 66 USPQ 308 (CCPA 1945); In re Swenson 56 USPQ 372 (CCPA 1942); In re Sola 25 USPQ 433 (CCPA 1935); In re Dreyfus 24 USPQ 52 (CCPA 1934).

3. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Park [US 6,103,137] in view of Smolinsky et al ["Reactive Ion Etching of Silicon oxides with Ammonia and Trifluoromethane, the Role of Nitrogen in the Discharge", J. Electrochem. Soc.: Solid-State Science and Technology, Vol 129 No. 5, May 1982, pp1036-1039] as applied to claim 18 above, and further in view of Blalock et al [US 5,286,344].

Park et al in view of Smolinsky et al substantially discloses the claimed method including using the etchant mixture essentially consisting of fluorocarbon and ammonia with the flow rate ratio of the fluorocarbon to ammonia of about 2:1 to about 40:1 for etching the insulative layer to form the opening.

Park et al in view of Smolinsky et al does not expressly teach the fluorocarbon comprising CF_4, CHF_3, and CH_2F_2.

However, using the fluorocarbons comprising CF_4, CHF_3, and CH_2F_2 has been known in the art for etching the insulative layer. See Blalock et al as an evidence that shows the using of the fluorocarbons comprising CF_4, CHF_3, and CH_2F_2 for etching the insulative layer.

It would have been obvious for those skilled in the art to modify the process of Park et al in view of Smolinsky et al by using the fluorocarbons comprising CF_4, CHF_3, and CH_2F_2 as taught by Blalock et al to etch the insulative layer for forming the opening

in a semiconductor. The selection of a known material based on its suitability for its intended use supported a prima facie obviousness determination in Sinclair & Carroll Co., Inc. v. Interchemical Corp. , 325 U.S. 327, 65 USPQ 297 (1945"Reading a list and selecting a known compound to meet known requirements is no more ingenious than selecting the last piece to put in the last opening in a jig - saw puzzle." 65 USPQ at 301.). It would have been obvious for those skilled in the art to use the fluorocarbons comprising CF4, CHF3 and C2H2F2 in the process of Park et al in view of Smolinsky et al to etch the insulative layer for form self-aligned contact opening as being claimed.

4. Claims 1-25, 36-46 and 64-70, as being best understood, are rejected under 35 U.S.C. 103(a) as being unpatentable over Tan et al [US 6,140,168] in view of Ding et al [US 5,814,563].

Tan et al, figs 1's and col 1-4, discloses a method for forming a self-aligned contact opening (124, fig 1D) in an insulative layer (114b) formed over a substrate comprising steps:

providing the substrate (100, fig 1A) comprising adjacent gate stacks being formed thereon, the adjacent gates stacks comprising opposed side wall spacers (108) which have been formed over the adjacent gate stacks *[claims 13-14, 36, 64]* ;

forming the insulative layer (114, fig 1B) over the substrate, the adjacent gate stacks and the side wall spacers which have been formed over the adjacent gate stacks *[claims 13-14, 36 and 64];*

forming a patterned photoresist mask layer (116, fig 1B) over said insulative layer *[claims 8 and 36];*

contacting and etching the insulative layer through an aperture (120, fig 1C-1D) in the patterned photoresist mask layer using a plasma etchant mixture *[claim 3]* comprising fluorocarbon (CHF3 and CF4, col 3 lines 42-55) *[claims 9-11, 18, 36, 66]* so as to form the self-aligned contact opening (124, fig 1D) without an etch stop *[claims 12, 42, 64]* in the insulative layer located between the adjacent gate stacks and the opposed side wall spacers aligning the self-aligned contact opening to the substrate *[claims 2, 13-14, 43]*, wherein said sidewall spacers are not etched and defines at least in part of said self-aligned contact opening (fig 1D) *[claims 13-14, 64]*;

removing the patterned photoresist mask layer after said contacting and etching *[claim 46]*.

➢ With respect to claims 1-4, 8-14, 18, 36-40, 42-44, 46, 64, 66 and 69, Tan et al does not teach: **1)** using the plasma etchant mixture essentially consisting of ammonia and said fluorocarbon of a ratio flow rate of the fluorocarbon to ammonia of 2:1 to 40:1 to form the self-aligned contact opening at a temperature of about –50 to 80°C with further forming a protective layer over the opposed side wall spacers of the adjacent gate stacks; and **2)** depositing a conductive plug inside said self-aligned contact such that said conductive plug is separated from said side opposed side wall spacers by said protective layer.

Regarding to **1),** Ding et al teaches using ammonia in addition to fluorocarbon with the flow rate ratio of the fluorocarbon to ammonia of 2:1 to 40:1 for plasma etching the insulative layer at a temperature of about –50 to 80°C would provide a better etch process with a high etch rate and an improved etch selectivity (see col 5-12). Ding et al

also teaches using the plasma etchant mixture consisting essentially fluorocarbon and ammonia would form an opening with a protective layer being formed on side wall of the opening (fig 1b or 1d). Therefore, it would have been obvious for those skilled in the art to modify the process of Tan et al by using the plasma etchant mixture essentially consisting of ammonia and said fluorocarbon with the flow rate ratio and temperature as being claimed, per taught by Ding et al, to etch the self-aligned contact with a better etch rate and improved etch selectivity without an etch stop. In addition, those skilled in the art would recognize that combination of the process of Tan et al in view of Ding et al will form a protective layer containing nitrogen over the opposed side wall spacers in the self-aligned contact opening.

Regarding to **2),** depositing the conductive plug inside the self-aligned contact opening is known in the art for forming electrical connection in a semiconductor device. In addition, Tan et al teaches forming a self-aligned contact opening is for forming electrical connection between source/drain region and metal layer [see col 2 lines 15-23). It would have been obvious for those skilled in the art to modify the process of Tan et al in view of Ding et al to depositing the conductive plug inside the self-aligned contact opening to provide electrical connection between source/drain region to certain location of the semiconductor device to operate the device.

➢ With respect to claim 19, Tan et al (col 3 lines 42-50) teaches using the fluorocarbons essentially consisting of CF_4 and CHF_3 for etching the insulative layer. Ding et al teaches $C_2H_2F_2$ can be added to the fluorocarbon mixture for etching the insulative layer. Therefore, it would have been obvious for those skill in the art to use

the fluorocarbon mixture comprising CF_4, CHF_3, and CH_2F_2 to etch the insulative layer in the process of Tan et al in view of Ding et al. In addition, using the fluorocarbons comprising CF_4, CHF_3 and CH_2F_2 has been known in the art for etching the insulative layer. The selection of a known material based on its suitability for its intended use supported a prima facie obviousness determination in Sinclair & Carroll Co., Inc. v. Interchemical Corp. , 325 U.S. 327, 65 USPQ 297 (1945). "Reading a list and selecting a known compound to meet known requirements is no more ingenious than selecting the last piece to put in the last opening in a jig - saw puzzle:" 65 USPQ at 301.).

➢ With respect to claims 4-7, 15-17, 20-25, 39-41, 44-45, 65-70, claimed ranges of temperature, flow rates, flow rate ratios in the etching step, absent evidence of disclosure of criticality for the range giving unexpected results are considered to involve routine optimization while has been held to be within the level of ordinary skill in the art. As noted in *In re Aller 105 USPQ233, 255 (CCPA 1955)*, the selection of reaction parameters such as temperature and concentration would have been obvious. *See also In re Waite 77 USPQ 586 (CCPA 1948); In re Scherl 70 USPQ 204 (CCPA 1946); In re Irmscher 66 USPQ 314 (CCPA 1945); In re Norman 66 USPQ 308 (CCPA 1945); In re Swenson 56 USPQ 372 (CCPA 1942); In re Sola 25 USPQ 433 (CCPA 1935); In re Dreyfus 24 USPQ 52 (CCPA 1934).*

Response to Arguments

3. Applicant's arguments filed on 10/7/02 have been fully considered but they are not persuasive.

Regard to Applicant's argument on pages 8-10, Applicant argues that combination of Park in view of Smolinsky fails to render obvious the claimed invention because Park discloses a method of plasma etching an oxide with three different etchant gases and Smolinsky teaches that NH_3/CHF_3 plasma proves to be a superior etchant for SiO_2 or P-glass on polysilicon. There is no motivation to combine Park with Smolinsky. The argument is not persuasive because both of Park and Smolinsky deals with the process of etching an insulative film using fluorocarbon including CHF_3. Smolinsky sees advantage of addition NH_3 to the fluorocarbon CHF_3 (4% NH_3/CHF_3 equivalent to the flow rate ratio or CHF_3:NH_3= 96:4 =24:1) to increase etch rate while maintaining an etch selectivity to the underlying layer below the insulative film (see Smolinsky, pp 1037 the 6th paragraph for details). Therefore, it would be obvious to combine the teaching of Smolinsky to the process of Park et al with motivation as taught by Smolinsky – increasing etch rate (eliminate problem of etch stop when etching the opening) while maintaining a good etch selectivity to the underlying layer. In addition, See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981), the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art.

Regard to Applicant's argument on page 9 that Applicant disagrees with the Office Action's further assertion "[w] ith respect to claims 4-7, 15-17, 20-25, 39-41, 44-45, 64-70, claimed ranges of temperature, flow rates, flow rate ratios in the etching

steps are considered to involve routine optimization", the argument is not persuasive because Applicant's Specification does not show criticality for each claimed range giving unexpected results. Instead, the claimed ranges are preferably used in the etching process as appointed Applicant's specification pages 7-10.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thanhha Pham whose telephone number is (703) 308-6172. The examiner can normally be reached on Monday-Thursday 8:00 AM - 7:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead Jr., can be reached on (703) 308-4940. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-3432 for regular communications and (703) 308-7725 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Thanhha Pham
January 16, 2003

CARL WHITEHEAD, JR.
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800